

OPIOID AND BENZODIAZEPINE PRESCRIPTIONS IN MISSISSIPPI



Mississippi Board of Pharmacy

August 2018

This report was prepared by NSPARC. For questions, contact
Dr. Mimmo Parisi at nsparc@nsparc.msstate.edu.

Acknowledgement

We would like to acknowledge the Mississippi Board of Pharmacy for their support in the preparation of this report. A special thanks goes to Stephanie Mueller for her contributions in validating all of the numbers. A special thanks also goes to Steve Parker for his intellectual contributions to this report.

Executive Summary

About 30 percent of Mississippi's population receives a prescription for opioids. In the state, the number of opioid prescriptions steadily declined between 2014 and 2017, while the potency of opioid prescriptions filled increased over the same period. The data also show that opioids are unevenly prescribed across the state; the same pattern was observed for benzodiazepine prescriptions. The Mississippi Board of Pharmacy will continue to take

proactive steps toward identifying the total number of opioid and benzodiazepine prescriptions and the total number of cases in which opioid and benzodiazepine prescriptions are filled on the same day. The Mississippi Board of Pharmacy will also monitor risk of addiction. Specifically, it will monitor trends that examine the extent to which individuals receive opioid prescriptions for a period of time.

Key Highlights

823,133

Mississippians had at least one opioid prescription filled in 2017

- 823,133 Mississippians had at least one opioid prescription filled in 2017, a decline from 961,691 in 2014 (see Table 1).
- In 2017, on average, patients who were prescribed opioids received about four opioid prescriptions (see Table 1).

257,099

Mississippians had at least one benzodiazepine prescription filled in 2017

- 257,099 Mississippians had at least one benzodiazepine prescription filled in 2017, a decline from 281,591 in 2014 (see Table 2).
- In 2017, on average, patients who were prescribed benzodiazepines received about five benzodiazepine prescriptions (see Table 2).

69,605

Mississippians filled a prescription for opioids and benzodiazepines on the same day in 2017

- 69,605 patients filled a prescription for opioids and benzodiazepines on the same day in 2017, a dramatic decline from 91,518 in 2014 (see Table 3).

Opioid Prescriptions in Perspective

- The five Mississippi counties with the most opioid prescriptions per capita are Issaquena, Perry, George, Yalobusha, and Webster (see Figure 1).
- The five Mississippi counties with the most benzodiazepine prescriptions per capita are Issaquena, Tishomingo, Alcorn, Marion, and Yalobusha (see Figure 2).
- The five Mississippi counties with the most patients who had opioid and benzodiazepine prescriptions filled on the same day per capita are Tishomingo, George, Marion, Alcorn, and Jefferson (see Figure 3).
- The average daily MME (morphine milligram equivalent), which indicates potency, per opioid prescription filled has steadily and substantially increased since 2014 (see Figure 4).
- The number of patients with opioid and benzodiazepine prescriptions filled on the same day is directly related to the number of days that patients had one or more opioid prescriptions (see Figure 5).
- Of all individuals receiving at least one opioid prescription, only about five percent received prescriptions for more than two years (see Figure 6).

Data

The data come from the Mississippi Prescription Monitoring Program (PMP), a division of the Mississippi Board of Pharmacy. The PMP data source contains information on prescriptions filled, pharmacies that fill prescriptions, doctors who write prescriptions, and patients who receive prescriptions. The analyses use PMP data spanning from January 2014 to June 2018 for this report.

Supplementary data for this report include National Drug Code (NDC) data, morphine milligram equivalent (MME) conversion data, and county-level population data for the state of Mississippi, all of which were obtained from publicly available sources.

NDC data contain unique codes and supplemental information (e.g., drug strength, ingredients, pharmaceutical class) on drug products that currently exist. Up-to-date NDC data for finished products (e.g., tablets, ready solutions) and unfinished products (e.g., powders that are used to mix a solution by pharmacists) were obtained online from the Food and Drug Administration, while historical NDC data for finished products were obtained online from the National Bureau of Economic Research Data Archives.¹ Historical NDC data were used to capture prescription drugs that may have been prescribed in past years but are no longer marketed. MME conversion data for opioid analgesics were compiled by the Center for Disease Control (National Center for Injury Prevention and Control 2016). Mid-year 2017 county-level population data were obtained from the U.S. Census Bureau.

Definitions:

Prescription fill: a complete filling of a prescription medication that is dispensed by a pharmacy to a patient; only prescription fills for patients with Mississippi addresses were counted for this report (veterinarian prescriptions were not counted for the purposes of this report).

Patients per capita: patients per 1,000 people in a county.

Daily MME (morphine milligram equivalent): as defined by the Center for Disease Control, an indication of the potency of an opioid medication, relative to the potency of the drug morphine, that is being taken daily; MME amounts listed in this report are the average daily MME amounts for all opioid prescriptions filled.

Methodology

Identifying Opioid and Benzodiazepine Prescriptions

Given that the focus of this report is opioid and benzodiazepine prescriptions in Mississippi, only prescription records falling into these pharmaceutical classes were observed. Two subsets of NDC data (one for opioids and one for benzodiazepines) were created. For each subset, finished product NDC codes were selected according to the appropriate pharmaceutical class.² Unfinished product NDC codes for each subset were selected based on the presence of an opioid or benzodiazepine ingredient.³

Analyses

The analytical purpose of this report is to identify the number of opioid and benzodiazepine prescriptions (both separately and concurrently) in Mississippi for the 2014-2017 period. For this report, a prescription fill is defined as a complete filling of a prescription medication that is dispensed by a pharmacy to a patient. In calculating the number of prescription fills, the initial filling of a prescription and any subsequent refills were counted as unique fills (i.e., a prescription that was refilled two times is counted as three individual fills). Duplicate records for a prescription with the same prescription number, dispenser, and refill number (i.e., sequential number of the refill) were only counted once. While PMP data include all prescriptions filled in Mississippi, only prescription fills for patients with Mississippi addresses were counted for the purposes of this report. Additionally, veterinarian prescriptions were not counted for the purposes of this report.

When examining prescription data at the patient level, a patient's first name, last name, birthdate, and gender were used to identify a unique individual. In examining the concurrent prescription of opioids and benzodiazepines to Mississippi patients, concurrent prescription was defined as a patient filling an opioid prescription and a benzodiazepine prescription on the same day.

For the purpose of spatial analysis, county-level maps detailing unique opioid and benzodiazepine patients (i.e., a patient having at least one opioid or benzodiazepine prescription fill) per capita were created. To identify the per capita figures for each Mississippi county, county of residence was established for all unique individuals in this study. Because county information is not captured

¹Historical NDC data for unfinished products were not available at the time of this report.

²For the opioid subset, prescriptions solely containing an opioid antagonist (e.g., naloxone) were excluded.

³NDC data for unfinished products do not specify pharmaceutical class, so a list of opioid and benzodiazepine ingredients was used to identify relevant NDC codes.

in the PMP data, the Geocode Address tool within ArcGIS was used to make this determination. An individual's full residential address was referenced, including street address, city, state, and ZIP code. The county identifier was then assigned to each geocoded record. The number of geocoded instances to find a summary total for each county was aggregated. Together with the county-level population estimates from the U.S. Census Bureau, the per capita ratio was calculated.

A supplementary analysis examined changes in average daily MME for opioid prescriptions from January 2014 to June 2018. Daily MME is an indication of the potency of an opioid medication, relative to the potency of the drug morphine, that is being taken daily. In this report, daily MME is calculated for individual prescriptions, and the average daily MME is the mean of daily MME amounts for all opioid prescription fills captured. In order to measure changes, daily MME amounts were calculated for individual opioid prescriptions using PMP records, MME conversion factors, and the following calculation

(National Center for Injury Prevention and Control 2016):

$$\text{MME/Day} = \text{Strength Per Unit} \times (\text{Number of Units/Days Supply}) \times \text{MME Conversion Factor}$$

In following the Center for Disease Control's methodology for analyses using MME calculations, cough and cold products and drugs not commonly used in outpatient settings were excluded.⁴

The relationship between duration of opioid prescriptions and concurrent prescriptions of opioids and benzodiazepines was considered. Duration of opioid prescriptions was measured by summing the number of days that a patient had one or more opioid prescriptions in 2017.

Life table techniques were used to examine the durations of individuals receiving prescriptions. Duration was defined in months.



⁴While injectable opioids were generally excluded from MME analyses in this report, some injectable opioids may have been included due to the inability to distinguish some injectable liquids from those taken orally that exist in the MME conversion data, as noted by the Center for Disease Control.

Findings

Opioid Prescriptions in Mississippi

Table 1 shows information on opioid prescription fills in Mississippi during the 2014-2017 period. The number of unique patients with at least one opioid prescription filled has continuously declined in recent years. From 2014 to 2017, the number of Mississippians receiving at least one opioid prescription decreased by 14.4 percent, with the greatest decline occurring between 2016 and 2017. There was also a 17.4 percent decline in the total

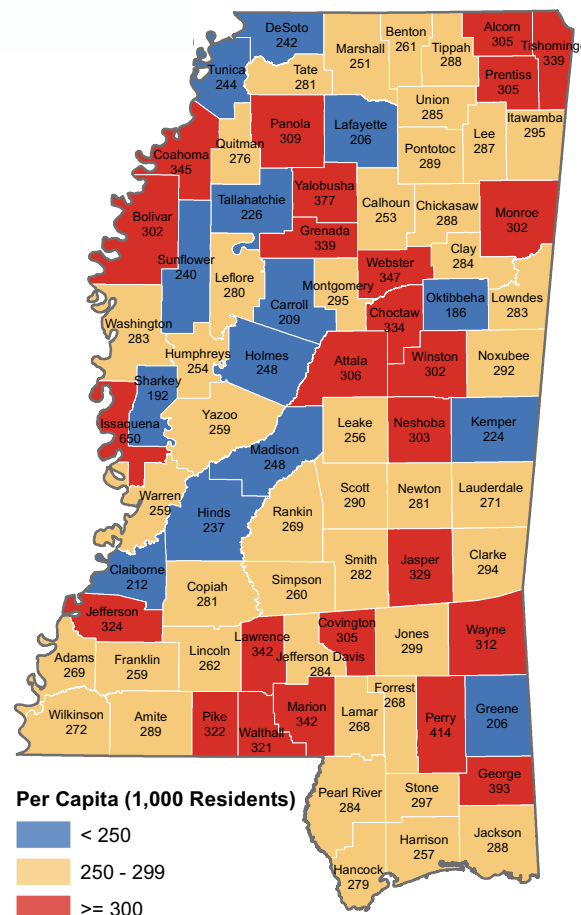
number of opioid prescriptions fills between 2014 and 2017. For those who received opioid prescriptions, the average number of prescription fills remained steady across the observed time period at nearly four prescriptions per person.

Figure 1 shows opioid patients per capita in 2017 at the county level. Issaquena, Perry, George, Yalobusha, and Webster counties have the highest number of opioid patients per capita.

Table 1: Opioid Prescriptions in Mississippi

Year	Mississippians with at least one prescription filled	Number of prescriptions filled (including refills)	Average number of prescriptions filled per patient
2014	961,691	3,735,238	3.88
2015	939,650	3,589,802	3.82
2016	903,879	3,475,218	3.84
2017	823,133	3,083,565	3.75

Figure 1: Patients with Opioid Prescriptions, 2017



Benzodiazepine Prescriptions in Mississippi

Table 2 provides a look at the annual measures for benzodiazepine prescriptions. From 2014 to 2017, the number of Mississippians with at least one benzodiazepine prescription filled declined, though not to the same extent as the case with opioid prescription fills. Overall, the number of benzodiazepine patients and benzodiazepine prescription fills in Mississippi declined

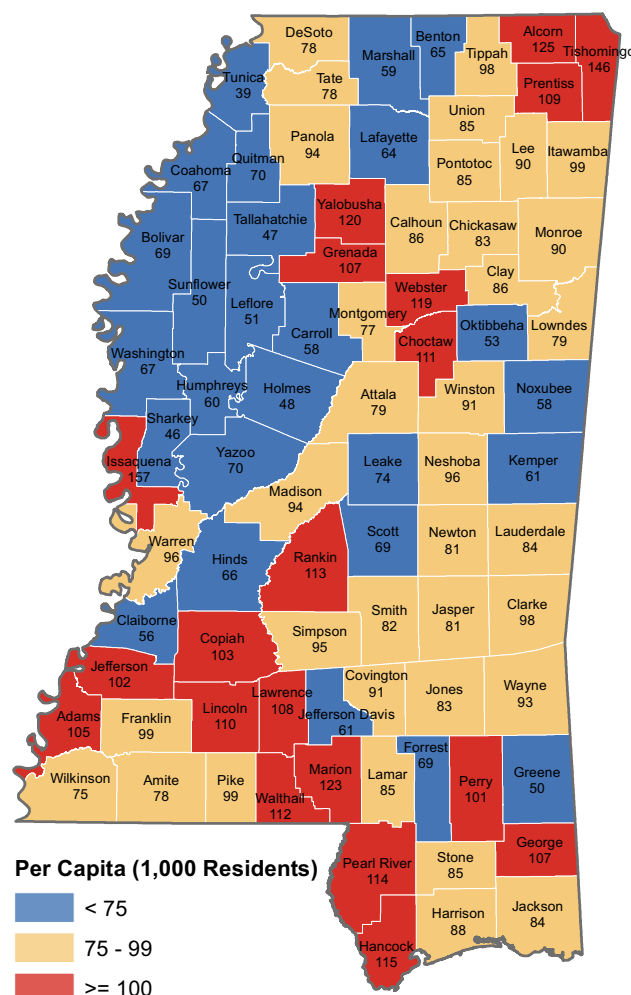
by 8.7 and 11.6 percent, respectively, between 2014 and 2017. The average number of fills for patients receiving benzodiazepine prescriptions remained steady across the observed time period at roughly five per person.

Figure 2 shows benzodiazepine patients per capita in 2017 at the county level. Issaquena, Tishomingo, Alcorn, Marion, and Yalobusha counties have the highest number of benzodiazepine patients per capita.

Table 2: Benzodiazepine Prescriptions in Mississippi

Year	Mississippians with at least one prescription filled	Number of prescriptions filled (including refills)	Average number of prescriptions per patient
2014	281,591	1,418,389	5.04
2015	279,804	1,417,620	5.07
2016	275,230	1,400,203	5.09
2017	257,099	1,254,292	4.88

Figure 2: Per Capita Patients with Benzodiazepine Prescriptions, 2017



Concurrent Opioid and Benzodiazepine Prescriptions in Mississippi

Table 3 presents annual figures for Mississippians with concurrent opioid and benzodiazepine prescription fills, showing that the number of patients who filled prescriptions for both opioids and benzodiazepines on

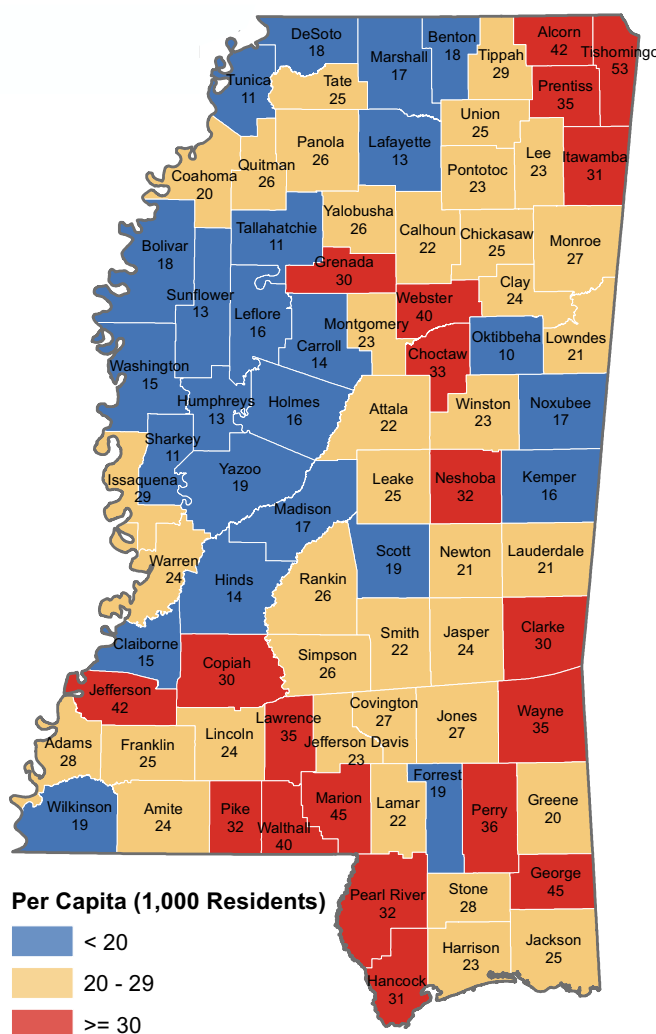
the same day declined by 23.9 percent between 2014 and 2017.

Figure 3 shows patients per capita in 2017 at the county level who filled benzodiazepine and opioid prescriptions concurrently. Tishomingo, George, Marion, Alcorn, and Jefferson counties have the highest number of patients per capita who filled prescriptions for benzodiazepines and opioids on the same day.

Table 3: Concurrent Opioid and Benzodiazepine Prescriptions in Mississippi

Year	Mississippians who filled a prescription for a benzodiazepine and an opioid on the same day
2014	91,518
2015	85,541
2016	80,293
2017	69,605

Figure 3: Per Capita Patients with Concurrent Opioid and Benzodiazepine Prescriptions, 2017

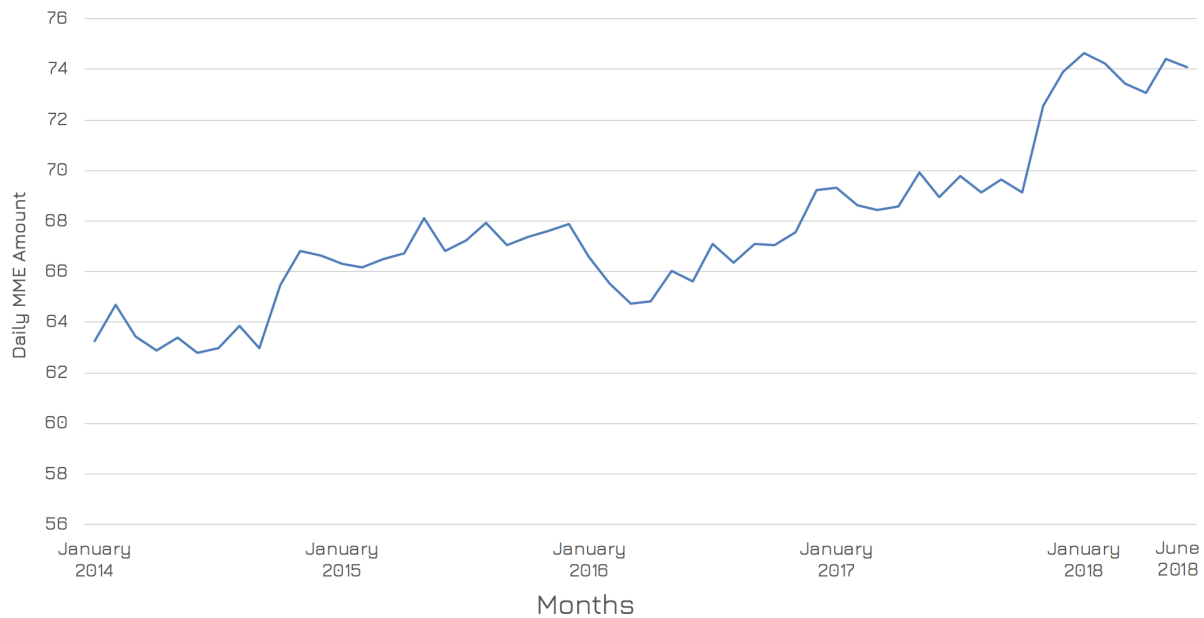


Opioid Prescriptions in Perspective

Figure 4 shows the average daily MME per opioid prescription fill from January 2014 to June 2018. While there are some periods of stagnation, the general trend

shows that the average daily MME of opioid prescriptions in Mississippi has increased. The greatest observed increase occurred between January 2016 and January 2018.

Figure 4: Average Daily Morphine Milligram Equivalent (MME) Per Opioid Fill, 2014-2018*



*MME calculations here exclude drugs that are not commonly used in outpatient settings, such as cough and cold medicines, and certain opioid drugs that are not critical for MME analyses per the CDC.

Figure 5 shows the prevalence of opioid and benzodiazepine prescriptions filled on the same day relative to the number of days that patients had one or more opioid prescriptions in the last year. The greater the number of days that a patient had one or more opioid prescriptions, the more likely they were to fill opioid and benzodiazepine prescriptions on the

same day. Of patients who had one or more opioid prescriptions between one and 30 days in 2017, only 3.19 percent concurrently filled opioid and benzodiazepine prescriptions on the same day. Of patients who had opioid prescriptions for 180 days or more in 2017, 26.66 percent concurrently filled opioid and benzodiazepine prescriptions on the same day.

Figure 5: Patients Who Filled Opioid and Benzodiazepine Prescriptions on the Same Day Relative to the Number of Days That They Had One or More Opioid Prescriptions, 2017

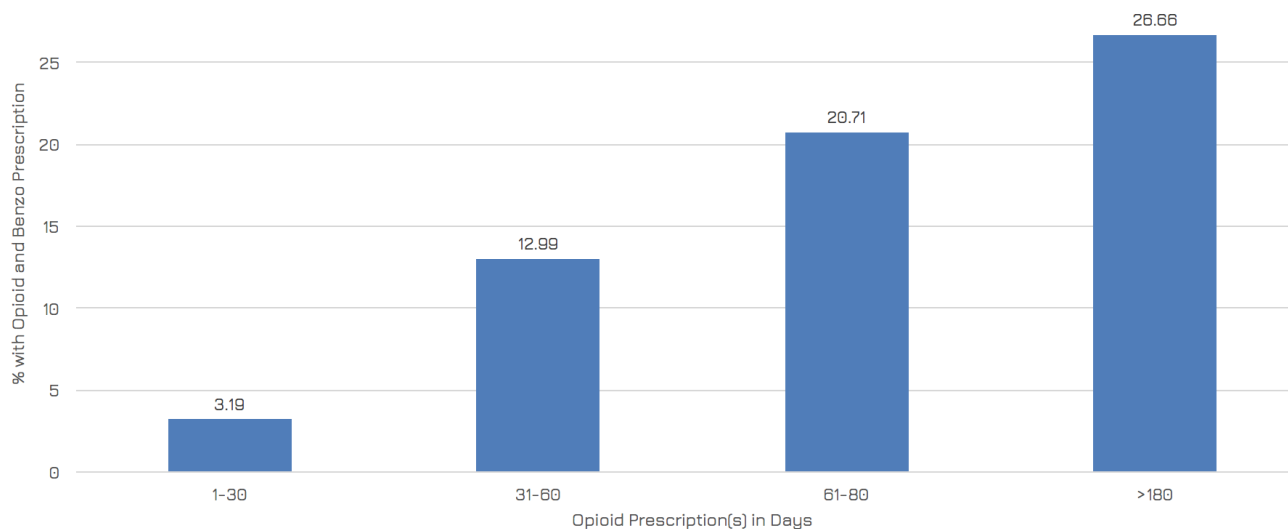
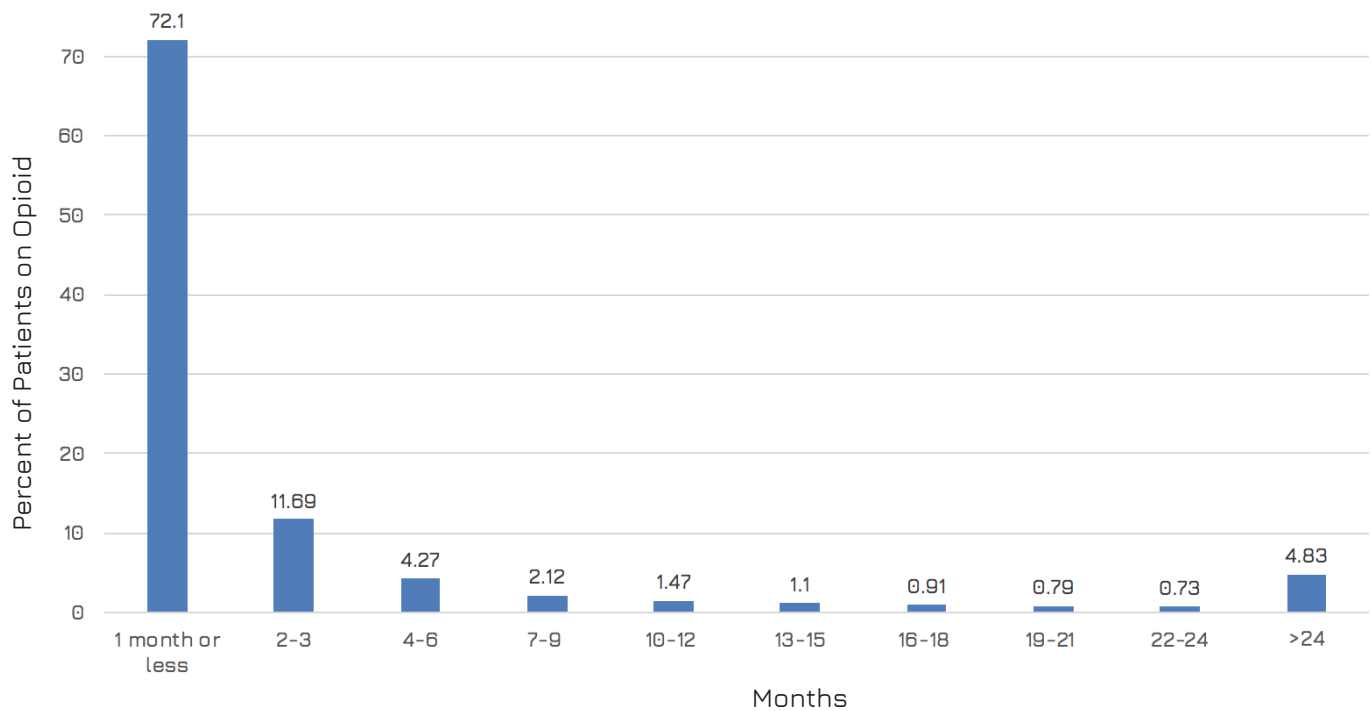


Figure 6 displays the lengths of time that patients received opioid prescriptions. **Fewer than five percent received opioid prescriptions for more than two years.** About 72 percent received opioid prescriptions for no more than a month. About 16 percent received

opioid prescriptions for more than one month but less than six months. Approximately four percent received opioid prescriptions for more than six months but less than a year. 3.5 percent received opioid prescriptions for more than a year but less than two years.

Figure 6: Length of Time Patients Received Opioid Prescriptions, 2014-2017



References

- National Center for Injury Prevention and Control. 2016. *CDC Compilation of Benzodiazepines, Muscle Relaxants, Stimulants, Zolpidem, and Opioid Analgesics with Oral Morphine Milligram Equivalent Conversion Factors, 2016 Version*. Atlanta, GA: Centers for Disease Control and Prevention. Accessed: July 2018. Available at: <http://www.pdmpassist.org/pdf/Conversion%20Reference%20Table.xlsx>
- National Bureau of Economic Research. 2018. "NDC Data -- National Drug Code Data." Accessed: July 2018. Available at <http://www.nber.org/data/national-drug-code-data-ndc.html>
- U.S. Census Bureau. 2017. "Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2017." Accessed: August 2018. Available at: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=PEP_2017_PEPANNRES&src=pt
- U.S. Food and Drug Administration. 2017. "National Drug Code Directory." Accessed: July 2018. Available at: <https://www.fda.gov/drugs/informationondrugs/ucm142438.htm>



OPIOID AND BENZODIAZEPINE PRESCRIPTIONS IN MISSISSIPPI



Mississippi Board of Pharmacy

August 2018